UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION VII
901 NORTH 5TH STREET
KANSAS CITY, KANSAS 66101

MAR 0 3 2005

MEMORANDUM

SUBJECT: Review of RAGS Part D Interim Deliverables Report
Herculaneum Lead Smelter Site
Herculaneum, Missouri

FROM: Mike Beringer
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TO: Bruce Morrison
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SUPR/FFSE

As requested, we have reviewed the "RAGS Part D Interim Deliverables Report for Community Risk Assessment" for the Herculaneum Lead Smelter Site, dated October 7, 2004. The Technical Review Work Group for Metals and Asbestos was consulted on Doe Run's proposal for deriving interior dust lead concentrations. Please let me know if you have any questions regarding the attached comments.

Attachment

Comments on the RAGS Part D Interim Deliverables Report
Herculaneum Lead Smelter Site
Herculaneum, Missouri
October 7, 2004

1. **Section 2 (p. 1)** The exposure areas are very large and were defined based on geographic features. It is highly unlikely that children and adults will move randomly across such large exposure units and spend equal amounts of time in each location, which violates a basic assumption when calculating exposure point concentrations for surface soil. This approach will tend to dilute soil concentrations leading to an underestimate of risks, unless surface soil contamination is relatively uniform across residential properties. The risk assessment must discuss this significant uncertainty and ensure that areas of higher concentration (i.e., localized hot spots) are not overlooked.

2. **Section 2 (p. 3)** The majority of surface soil samples at the high school were collected from the football field. These data do not reflect exposure to a typical student because only a small subset of students will actually use the football field. The risk assessment should discuss this uncertainty and its potential impact on risk estimates.

3. **Section 3 (p. 5)** The risk assessment and conceptual site model should clearly distinguish between current and future exposure scenarios.

4. **Section 3.1 (p. 5)** (a) This section refers to children as "hypothetical" when, in fact, there are young children (< 7 years old) currently living in the voluntary property purchase area. Therefore, the children represent a current exposure scenario and should not be referred to as "hypothetical." (b) For all residential exposure areas, the cancer risk for children and adults should be either added together or an age-adjusted approach should be used consistent with RAGS Part B, which is standard risk assessment practice in Region 7.

5. **Section 3.2 (p. 6)** As discussed above, the risk assessment should not refer to child residents as "hypothetical" if they are currently living in the buffer zone area.

6. **Section 3.6 (p. 8)** The range of exposure frequencies evaluated for the child visitor should be 1, 3, and 5 days because their behavior is not known with certainty and this range is consistent with other intermittent exposure scenarios being evaluated in the risk assessment.

7. **Section 4.1.1 (p. 9)** Region 7 is unable to critically evaluate the data without more details on data collection and quality assurance/quality control (QA/QC). For example, it is unclear whether the soil samples were sieved to obtain the fine fraction. In addition, this section concludes that the DRRC XRF and lab data are considered useable for risk assessment purposes, but does not discuss the criteria used to make this determination. The draft risk assessment must include additional details on sample collection, QA/QC, and documentation supporting the conclusion the data are adequate for risk assessment purposes. Doe Run

should follow EPA's "Guidance on Data Useability in Risk Assessment" and the "Risk Assessment Guidance for Superfund (RAGS) Part D" in providing adequate documentation to address this comment.

8. **Section 4.1.2 (p. 11)** The draft risk assessment should provide additional details on the XRF and laboratory correlation analysis, including figures of both regression analyses, the high data point excluded from the second analysis, and the 95% confidence intervals for parameters in each regression equation. Doe Run should consider conducting a correlation analysis for several data intervals (e.g., 0-400, 400-800, etc.) to determine if the correlation varies with soil concentration and also limiting the analysis to soil concentrations less than 2000 ppm, which is the concentration interval where site-specific decisions will be made. These additional analyses may indicate that a "correction factor" is warranted for the XRF data.

9. **Section 4.2 (p. 12)** (a) As mentioned above for soil data, the draft risk assessment must include additional details on interior dust data, including sample collection, QA/QC, and data useability. For example, no information is presented on whether the presence of lead-based paint was evaluated. (b) Doe Run should also use the EPA interior dust data to discuss whether recontamination of homes is occurring from the lead smelter.

10. **Section 4.3.1 (p. 13)** While the majority of air samples for arsenic, cadmium, nickel, and zinc may have been "nondetects," this does not necessarily mean they should be excluded as COPCs. The detection limits should first be compared to risk-based concentrations (e.g., EPA Region 9 screening tables) to determine if they are adequate and the detected values should also be compared to the ambient air screening values.

11. **Section 4.4 (p. 15)** It is unclear which data will be used in the risk assessment because this section first states the slag data presented in Table 4 represents the yearly average and then later states the 2001 data are from one slag sample analyzed in June 2001. Please clarify how the results in Table 4 were obtained and provide additional details on sample analysis including laboratory detection limits.

12. **Section 5 (p. 17)** (a) In previous comments on the risk assessment work plan, Region 7 had informed Doe Run that using background surface soil concentrations that are not site-specific values was inadequate and that a statistical hypothesis test should be used to differentiate site-related and background constituents (see EPA's "Guidance for Characterizing Background Chemicals in Soil at Superfund Sites" dated September 2002). Even though Doe Run did not incorporate this comment, additional site-specific data would not likely change the decision to retain arsenic as a COPC and the approach used is satisfactory in this case. (b) It is Region 7 risk assessment practice to screen contaminants against 1/10th of the Region 9 PRGs when they are based on non-cancer health effects to account for potential

additivity of adverse health effects. The values for cadmium, nickel, and zinc should be multiplied by 0.1 in Table 5 before screening COPCs.

13. **Section 6.1 (p. 18)** (a) If surface soil data are not available for all four quadrants, then the residential property should be excluded from the risk assessment because there is significant uncertainty with relying on one data point to represent the average lead concentration across the entire yard. (b) The risk assessment should also evaluate and briefly discuss the spatial variability of contaminants given the exposure units are very large, as well as the uncertainty associated with using such large exposure units (see Comment #1). (c) The draft risk assessment should clearly explain EPA's ProUCL software was used to calculate exposure point concentrations (EPC) and provide documentation of the EPC recommendations generated by ProUCL.

14. **Section 6.2 (p. 19)** To evaluate intermittent exposure scenarios, Doe Run proposes to use the average soil concentration of the six residential Exposure Areas as the concentration of the secondary area. Region 7 recommends that Doe Run use the highest average lead concentration of the residential areas to ensure that risks will not be underestimated.

15. **Section 6.3.1 (p. 20)** It is clearly evident from Table 3 that the observed air lead concentrations exceed the modeled values at the two closest monitor locations for all quarterly samples in 2003, even though the facility does not generally operate at full capacity. However, Doe Run does not provide any rationale explaining why the 2003 monitoring results will only be used for properties within 500 feet of these two monitoring stations. Region 7 believes a much larger area should be assigned the 2003 observed air concentration. Doe Run must provide additional justification for selecting the size of residential area where the monitoring results will be used as the ambient air lead concentration.

16. **Section 6.4.1 (p. 22)** (a) Region 7 agrees that very little confidence should be placed on the site-specific regression analysis because: (1) 26 properties represents less than 3% of the properties with soil data; (2) an r^2 of 0.38 to 0.42 represents a relatively weak linear relationship; and (3) critical details on dust sampling are lacking which makes it impossible to evaluate the adequacy of these data. For example, there is no discussion of whether lead-based paint was identified at the 26 properties. Therefore, the results of the regression analysis should not be used to make any definitive conclusions regarding the relationship between interior dust lead concentrations and those in soil and air. (b) Doe Run has proposed to use EPA's "Aggregate" model for estimating interior dust lead concentrations, as opposed to the default relationship between air, soil, and interior dust in the IEUBK model. Region 7 questions whether the conditions under which the lead point sources were operating before 1988 are comparable to Doe Run's current operations in Herculaneum. For example, the outdoor air concentrations were much higher in the past and likely had a bigger impact on interior dust lead concentrations as compared to outdoor soil. Region 7 has consulted with EPA's Technical Review Work Group for Metals and Asbestos which agrees use of the "Aggregate" model is a reasonable alternative in this case for estimating interior dust lead

concentrations while the smelter is in operation. However, EPA guidance requires that baseline risk assessments evaluate both current and future exposure scenarios and the "Aggregate" model is not relevant for evaluating future exposure when the smelter is no longer operating. Therefore, the risk assessment must also use the IEUBK default approach for estimating interior dust concentrations to evaluate future exposure to full-time residential children.

17. **Section 6.4.2 (p. 24)** There is no basis for using the soil coefficient of the "Aggregate" model for estimating the interior dust concentrations for arsenic and cadmium. The risk assessment should assume the interior dust concentrations equal the outdoor soil concentrations because there are no site-specific data to show otherwise.

18. **Section 7.1 (p. 25)** (a) The soil/dust ingestion rates of 50 mg/day for an adult resident and 100 mg/day for a child resident are central tendency estimates and not relevant for estimating reasonable maximum exposure (RME) estimates for arsenic and cadmium. Doe Run should use soil ingestion rates of 100 mg/day for adult residents and 200 mg/day for child residents, which is consistent with EPA risk assessment guidance. (b) To represent an RME scenario, the risk assessment should use a soil ingestion rate of 100 mg/day for school children.

19. **Section 7.2 (p. 26)** (a) Doe Run should submit alternative lead bioavailability estimates to Region 7 for review before submitting the initial draft baseline risk assessment. (b) Region 7 has not formally adopted the Region 10 bioavailability guidance for arsenic, but believes it is a reasonable approach which can be used in the risk assessment.

20. **Section 7.3.1 (p. 27)** For elementary school children, the risk assessment should use a soil adherence factor of 0.2 mg/cm^2, based on children playing in wet soil. This value is consistent with RAGS Part E which recommends using a high-end soil contact activity with a central tendency weighted adherence factor for that activity.

21. **Section 7.3.2 (p. 27)** While the proposed skin surface areas for school children seem reasonable, additional details are necessary for Region 7 to verify these values.

22. **Section 7.4 (p. 28)** Doe Run proposes to use the baseline blood lead (PbB) and geometric standard deviation (GSD) values from NHANES 1999-2000. However, EPA has not yet reviewed these data nor has Doe Run provided any documentation for the proposed values in Table 8. In addition, the NHANES Analytic Guidelines state "In order to produce estimates with greater statistical reliability, combining two or more 2-year cycles of the continuous NHANES is encouraged and strongly recommended." The risk assessment must use the PbB and GSD values from EPA's analysis of Phases 1 and 2 of NHANES III (see www.epa.gov/superfund/programs/lead/prods.htm) until EPA provides an update using more recent NHANES data. More specifically, Region 7 recommends using PbB and GSD values from "All Regions" or from the "Midwest Region." However, the Technical Review Work

Group and Region 7 do not recommend using PbB and GSD estimates that are stratified by both geographic region and race/ethnicity group because of the small sample sizes.

23. **Table 2.1** (a) As discussed in Comment #12b, Region 7 screens contaminants against 1/10th of the Region 9 PRGs when they are based on non-cancer health effects. Doe Run should use this screening approach which will result in several instances where additional COPCs are retained in the risk assessment. (b) Footnote #4 should be change to indicate the 2004 U.S. EPA Region 9 PRGs were used for screening COPCs.

24. **Tables 4.1 to 6.1** (a) Region 7 uses a body weight of 15 kg for a 1 to 6 year old child, which can be found in "U.S. EPA (1991). Risk Assessment Guidance for Superfund Volume I: Human Health Evaluation Manual, Supplemental Guidance, Standard Default Exposure Factors. OSWER Directive 9285.6-03. Office of Emergency and Remedial Response, Washington, D.C." (b) The correct reference for IR-S, EF, ED, and BW is "EPA, 1991," while the reference for AT-C and AT-N should be RAGS Part A (EPA, 1989). (c) "EPA, 2001" should be replaced with "EPA, 2004" because the final version of RAGS Part E was published in August 2004.